W. FRAZIER.
Wind-Mill.

No. 211,393. Patented Jan. 14, 1879.

Fig. 1.

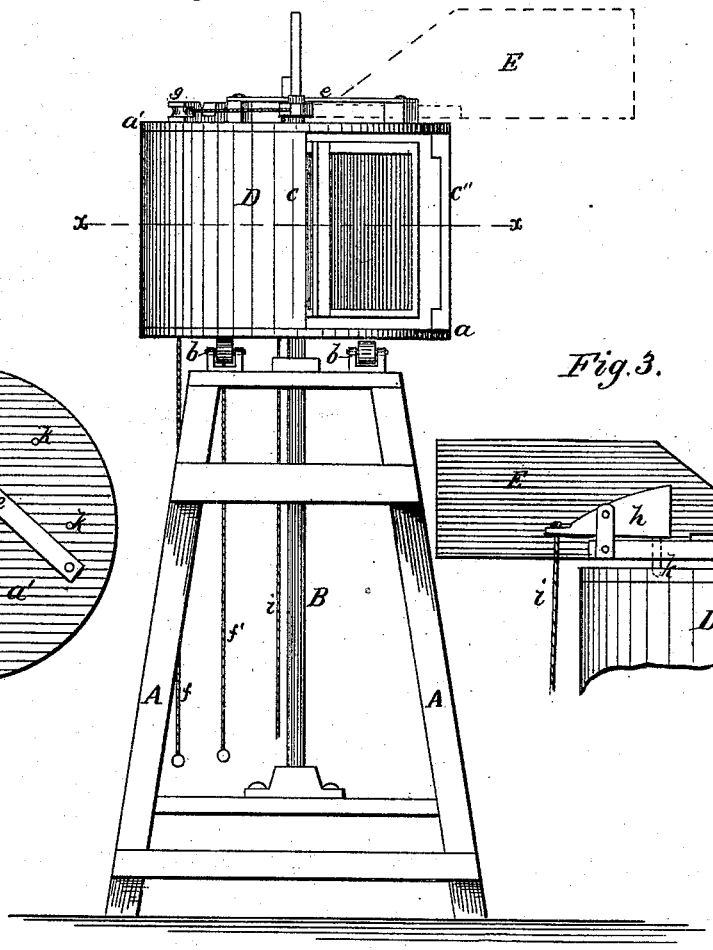


Fig. 2.

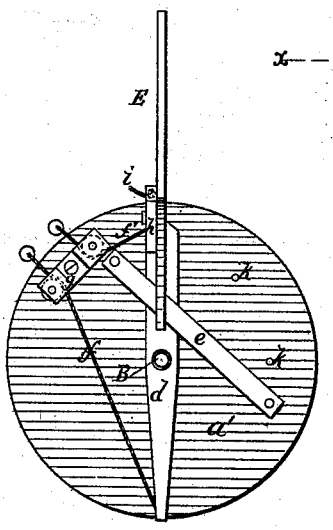


Fig. 3.

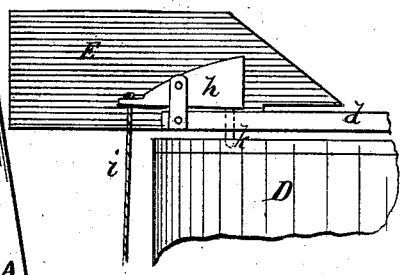
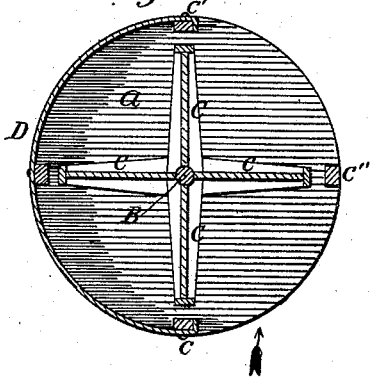


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM FRAZIER, OF CENTRALIA, ILLINOIS.

IMPROVEMENT IN WINDMILLS.

Specification forming part of Letters Patent No. **211,393**, dated January 14, 1879; application filed November 1, 1878.

To all whom it may concern:

Be it known that I, WILLIAM FRAZIER, of Centralia, in the county of Marion and State of Illinois, have invented a new and Improved Windmill, of which the following is a specification:

The object of this invention is to construct the windmill in such a way that the wind will act upon the whole or any part of the surface of the arms or sails.

The invention will first be described in connection with the drawing, and then pointed out in the claim.

In the accompanying drawings, Figure 1 is a side elevation of my improvement. Fig. 2 is a top view or plan of the same. Fig. 3 is a view, in detail, of the device for adjusting the jacket or casing with relation to the direction of the wind, and Fig. 4 is a horizontal section of the device, taken on line *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the frame of the windmill, in the middle of which is journaled the upright shaft B, to the end whereof, projecting through the top of the frame, are fixed the arms or sails C. The revolution of these arms or sails gives motion to the shaft B, which in turn transmits it to machinery through suitable gearing.

D represents a semi-cylindrical jacket or casing fixed to a circular bottom, *a*, and similar top *a'*. The bottom and top of this are placed loosely on the shaft B, so as to partially incase the arms or sails C, one-half being exposed, as clearly shown in Fig. 4. This jacket or casing is sustained in an upright position by the shaft B, but does not revolve with it, and it bears upon the friction-rollers *b b*, fixed to the top of the frame.

The jacket or casing D is designed to serve as a cut-off for regulating the speed and power of the mill, and to this end it is operated in the following manner: Supposing the wind to come from the direction of the arrow in Fig. 4, the jacket is set so that its two ends, *c c'*, will be in a line parallel with the direction of the wind, and thus the whole surface of the arms or sails will be exposed to the action of the wind, utilizing its whole force, and at the same time back action is prevented, as the arms or sails are not exposed to the wind until they pass the end *c*, and when this is passed they are exposed to the direct action of the wind, and no backward resistance is possible. When the force is to be decreased the jacket is rotated to the right, so that the end *c* will cover horizontally a part of the arms or sails, reducing the radial surface of the same from the axis outward, thus diminishing the effects of the wind, and as a result lessening the power and speed of the mill. In this way, by adjusting the jacket, the whole surface of the arms may be exposed to the wind or any part thereof; also, by turning the casing far enough—say, with the ends in a line at right angles to their position in Fig. 4—the wind may be entirely cut off from the arms or sails.

As the jacket or casing has to be adjusted from below, a device to accomplish this object will now be described: The vane E is connected with an arm, *d*, which is pivoted to the end of shaft B, projecting through the top *a* of the casing D. The arm *d* moves freely on its axis independently of the movement of the shaft B; but the extent of its movement is limited by the guard *e*, so that the vane can only move from the end *c'* of the casing to *c''*, or over a quadrant of a circle. To the end of arm *d* opposite the vane is connected a rope, *f*, which is passed through the sheath *g* over a pulley pivoted therein, and extends thence down to the base of the mill. Another rope, *f'*, is fixed to the opposite end of the arm *d*, and runs thence through the sheath *g* over another pulley pivoted therein, and likewise extends down to the base of the mill. By means of these ropes the vane can be drawn back and forth from *c* to *c''* and stopped in any suitable position, and it can be made to move the jacket D by a pawl, *h*, pivoted in the end of arm *d*, and operated through the cord *i*, convenient to the base of the mill. This pawl is in such a position that when the vane is moved back and forth it describes a segment of a circle, in which a line of holes, *k*, is made in the top *a'*, so that it can engage these holes when desired, and thus secure the jacket in any desired position.

The operation of this part of my invention is as follows: When the whole surface of the arms or sails is to be free to the wind, the

vane E is moved around until it is in a line parallel to the ends c c' of the jacket and the pawl allowed to enter a hole that will retain it in this position. The wind will, of course, force it around until it is in a direction parallel to the way it is blowing, and in this position the full expanse of the arms or sails will be subjected to the action of the wind. If a less surface is required, the pawl is released and the vane drawn toward c'' the desired distance and secured by the pawl at the desired place. The force of the wind will again carry it around until it is parallel to its course, and now the end c of the jacket will be rotated around against the wind, thus coming between it and a certain amount of the radial length of the arms or sails, and thus diminishes the extent of the surface exposed to the action of the wind. When the mill is to be stopped entirely the vane is brought around to c'' and secured, when it will be carried around so that the point of the jacket opposite c'' will be brought to the wind and none will reach the arms or sails, thus bringing them to a stand-still. Thus it will be seen the speed and power of the mill can be adjusted at pleasure.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

As an improvement in windmills, the vane or pivoted arm d, provided with pawl h and operated by ropes f f', in combination with semi-cylindrical jacket D and arms or sails C, substantially as described.

WILLIAM FRAZIER.

Witnesses:

ABSALOM FRAZIER,

J. W. C. GALL.